Perspectives, issues and needs in community-based risk assessment

USEPA Workshop on Research Needs for Community-Based Risk Assessment
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Outline for this talk

- One definition of community-based risk assessment (CBRA)
- Some CBRA conceptual approaches
- Influence of participant perspective on needs
- Issues and needs encountered in risk assessments with community participants (organized per 2003 USEPA Framework for Cumulative Risk Assessment)
- USEPA tools and approaches for CBRA
- Summary

One definition of community-based risk assessment

According to the Workshop website,

"**Community-based risk assessment** is a model that addresses the multiple chemical and non-chemical stressors faced by a community, while incorporating a community-based participatory research framework and a transparent process to instill confidence and trust among community members."

(http://www.scgcorp.com/riskassessments/index.htm)

1996 NRC “Understanding Risk” p. 28

(http://books.nap.edu/openbook.php?isbn=030905396X)

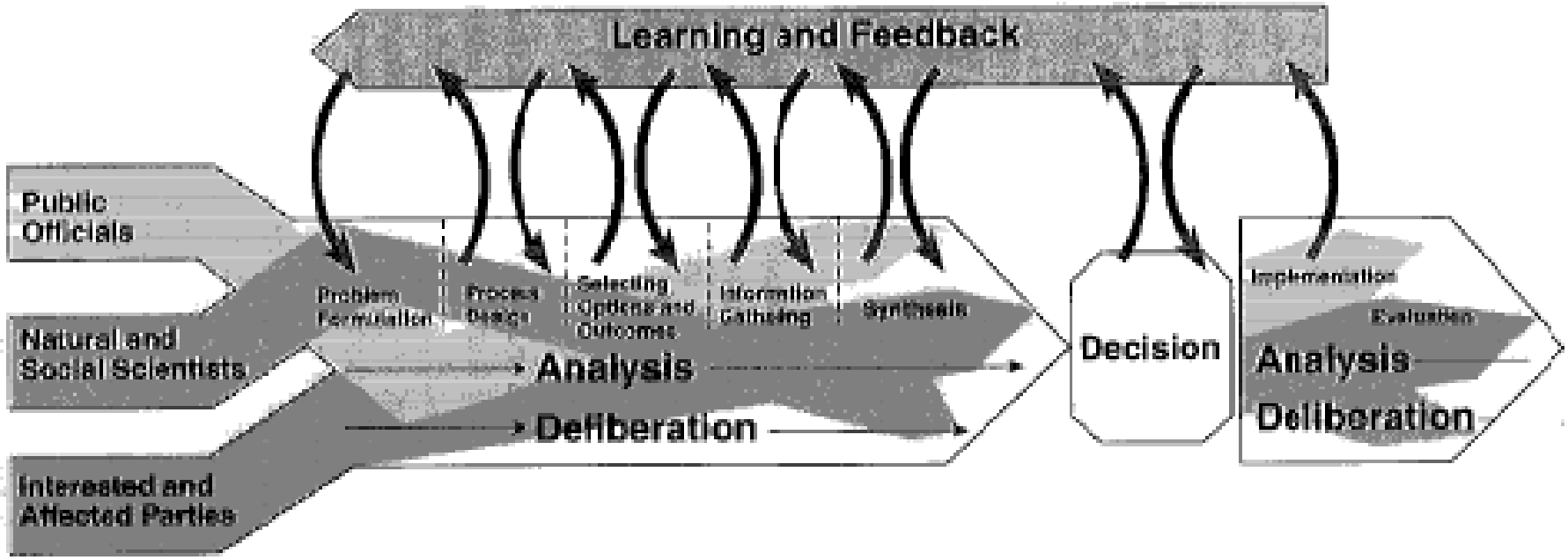

FIGURE 1-2. A schematic representation of the risk decision process.

1997 Presidential/Congressional Commission on Risk Assessment and Risk Management vol. 1

(http://www.riskworld.com/Nreports/1997/riskrpt/pdf/EPAJAN.PDF)

2003 USEPA Framework for Cumulative Risk Assessment, p. 13

(http://cfpub.epa.gov/ncea/cfm/recordisplay.cfm?deid=54944)

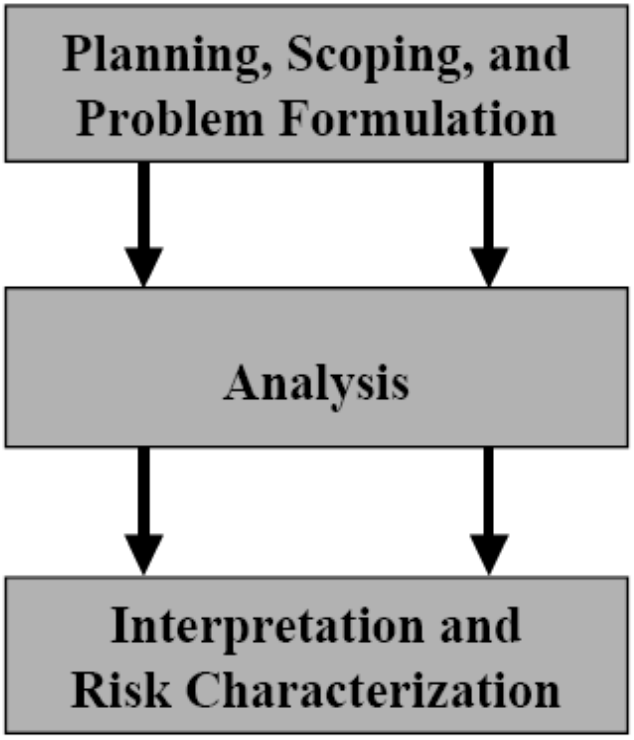

Figure 1-3. Framework for cumulative risk assessment.

Analytic focus/orientation - agent/stressor, community/host

(2003 Framework for Cumulative Risk Assessment, p. 1-2)

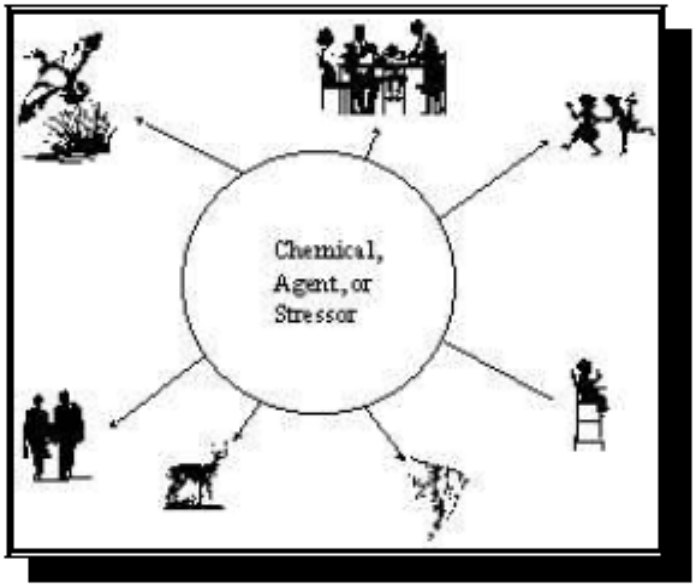

Figure 1-1. Chemical (or stressor) focused assessment starts with a source and evaluates how the chemical gets to various populations or ecological targets. Individual assessments may choose to pursue some or all pathways, media, or population segments.

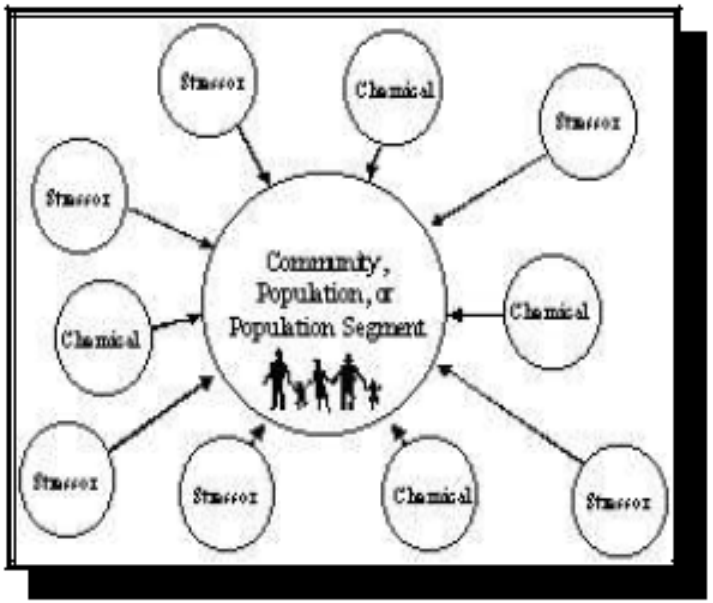

Figure 1-2. Population-based assessments start with the receptors, and determine what chemicals, stressors, or other risk factors are affecting them.

CBRA-oriented toxicity assessment might put prior slide in the following words:

"...Our guiding thesis is that toxicity is not simply an inherent property of the toxicant but derives from an assortment of jointly acting variables bound implacably into the individual."

Weiss B, Bellinger DC. Social ecology of children's vulnerability to environmental pollutants. 2006 EHP 114, 10: 1479-1485

Needs: influence of a hypothetical CBRA participant's perspective

- Community members – need timely "answers"
- Research scientists – need timely publications
- Industry participants – need to persuade affected parties that risks are "acceptable"
- USEPA managers – need to address management priorities (e.g. GPRA goals)
- State, Regional risk assessors – need to conduct credible assessments that address participant needs

General CBRA needs - examples

- **Resources:** community assessment can require big, multi-disciplinary commitment and follow-through (expertise, people, organization, time, etc.)
- **Host- and media-integrated human health risk assessment methods** that unify stressor- and host-focus as well as USEPA Programs fragmented by environmental medium or law (relevant parts of Superfund, RCRA, Pesticides, Air, Water, RAF etc. methods?)
- **Air Program:** combined metric for criteria pollutant and noncriteria pollutant hazards or risks: is “composite risk characterization” (separate presentation) enough?

Should metrics be combined?

- **<u>Yes</u>: if needed, feasible and if "combining" is logically consistent and interpretable**
- **<u>No</u>: if "combining" results in excessive information loss, hidden incompatibilities, subjectivity, interpretability/ communication problems, false precision, etc.**

(Figure from Greg Paoli; http://www.iom.edu/?id=32160)

General CBRA needs - examples

Exclusion of “background” stressor exposure or susceptibility ---> incremental assessments irrelevant to some participants. Possible remedies:

(a) address site-specific “background” susceptibility and/or stressor exposures; or

(b) lacking site-specific information, derive a **“**reference human exposure profile” to [median??] environmental pollutants to which incremental exposures could be added (e.g. use Exposure Factors Handbook and Pesticides Program info??)

CBRA planning, scoping and problem formulation: example issues, needs

1. Methods for choosing participants from "the community"? (in addition to technical experts and self-selectees)
2. Scoping: facilitated meeting among...(?) to formulate analytic problem(s) and scope
3. **Getting right science** (e.g. info on substandard housing, neighborhood crime) as well as **getting science right** (i.e. pollutant exposure concentrations)
4. How to include **"background" stressor exposures, pollutant and/or nonchemical**
5. Update July 1997 planning and scoping "Guidance" (http://www.epa.gov/OSA/spc/pdfs/cumrisk2.pdf)?

2002 USEPA "Lessons Learned on Planning and Scoping": some orienting questions

(http://www.epa.gov/OSA/spc/pdfs/handbook.pdf, p. D-7)

1. Who are the parties proposing the assessment?
2. Are there other interested or affected parties?
3. **What questions do the parties want the assessment to answer?**
4. What analysis will be done to answer these questions?
5. Who will conduct the analysis?
6. When are the assessment results needed?
7. Who will pay for the assessment?
8. How will the assessment results be used?

CBRA analysis: example issues, needs

1. More timely IRIS assessments/reassessments (also needed: evaluation of organizational and political influences [levels of review; executive branch process control] on IRIS productivity?)
2. MOA determinations e.g. for benzene
3. Short term RfCs e.g. benzene, naphthalene
4. Limits of Haber's Rule
5. **Assertion that local residents' health is "poorer than national averages"** and not addressed in USEPA exposure and toxicity estimates - how to evaluate this in CBRA context? If true, how to address?

CBRA analysis: example issues, needs

1. Are ~20-yr old meteorology datasets appropriate for simulating local weather patterns 30-70 years in the future?
2. Appropriateness of data from fixed-site air monitors as surrogate for human exposure concentrations (e.g DEARS Detroit study)
3. Synergistic or antagonistic toxic effects – how likely in some mixtures?
4. Feasibility of an all-species (including humans) hazard quotient or hazard index

CBRA risk characterization and interpretation: example issues, needs

1. Better communicate hypothetical vs. actuarial numeric risks (e.g. provide lifestyle-risk context?); accurate and balanced characterization (i.e. not just “the number”)
2. Characterizing and communicating “cascading” uncertainty, e.g. formal vs. descriptive methods
3. What are **attributes of successful/unsuccessful deliberative processes** (e.g. CARE experiences)?
4. Should a formal **evaluation** step (per 1996 NRC, 1997 PCCRARM) be included in USEPA risk assessments?
5. Expectations management? i.e. USEPA role in addressing socially-embedded issues

Examples of CBRA approaches, guidance and tools available through USEPA

- **Community Action for a Renewed Environment, CARE** (http://www.epa.gov/care). Competitive grant program to help communities organize and take action to reduce toxic pollution in local environment
- **Community Air Screening How-To Manual** (http://www.epa.gov/oppt/cahp/pubs/howto.htm)
- **ATRA vol. 3–Community-Scale Assessment** (http://www.epa.gov/ttn/fera/risk_atra_vol3.html), especially Chapters 10-12, a sort of "CARE how-to" guide
- **RAGS Part A supplement-Community Involvement in Superfund Risk Assessments** (http://www.epa.gov/oswer/riskassessment/ragsa/pdf/ci_ra.pdf)
- **RCRA Public Participation Manual** (http://www.epa.gov/epaoswer/hazwaste/permit/pubpart/manual.htm)
- **OSA/SPC/RAF Cumulative Risk Assessment Program** http://www.epa.gov/OSA/spc/2cumrisk.htm

Summary

- CBRA attempts to address real-world human susceptibility, exposure and risk with inclusive, often resource-intensive deliberative process
- Some CBRA conceptual approaches and tools are already available
- CBRA needs to:
  - process multiple, diverse participant input to better identify and formulate problems;
  - help unify fragmented disciplinary “silos”;
  - acquire needed science to address questions/issues of participant concern (long term commitment)